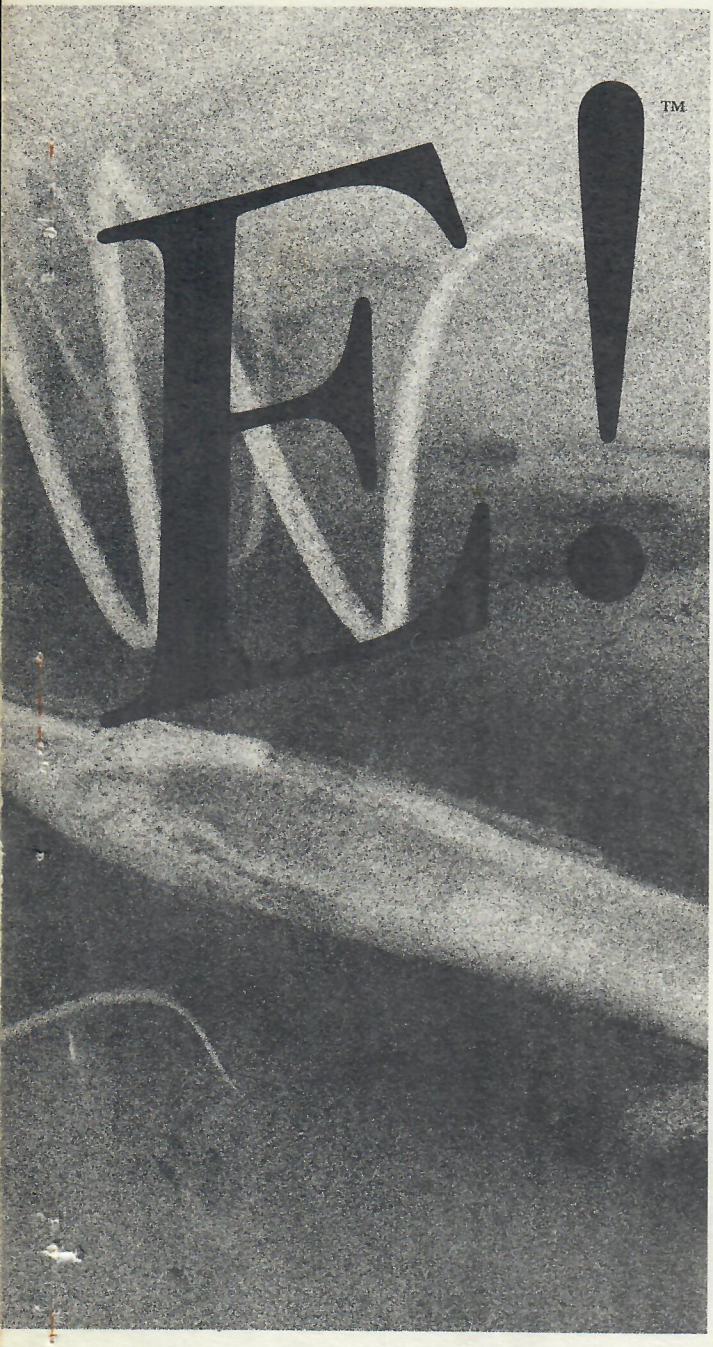
2,02 B
BIGGER
BOARD



This setup procedure should be performed INSTEAD OF the setup procedure described in the E! manual!!

E! Setup Procedure...

Please note that when your DX7 is switched on for the first time after REV 2.xx is installed, the DX7's LCD Screen should read "PROBLEM... RAM IS CORRUPT". This is not unusual. Simply allow your DX7 to run in this mode for approx. 10 seconds before turning the power off.. and then on. The DX7 should now say "WELCOME TO E!".

This setup procedure will insure that you have a secure starting point from which to explore E! REV 2.xx. This procedure will destroy all VOICE DATA that is in the machine so please take steps to protect you valuable voices BEFORE performing this procedure!!!

Simply press the keystrokes that are indicated in parentheses...

1. Remove internal memory Protect (Function button, then OP SELECT button two times, button 31 two times, off).

2. Set Ram format to "Voice". (button 20, on, off)

3. Go to Internal Mode (internal play)

4. Choose a Ram bank with the data entry slider or the YES/NO Buttons (start with internal 0)

5. Press any voice change button to choose a voice in that bank (Button 1)

6. Erase that bank (Function button, Then OP SELECT two times, then button 19 three times, then Yes two times)

7. Go TO Internal Mode (Internal play)

8. Repeat steps 4 through 8 for banks Internal 1 through Internal 9.

9. Insert a RAM or ROM cartridge into the cartridge slot.

10. Press the CRT PLAY button

11. Press a voice select button to make the cartridge "CURRENT". (Button 1 to 32)

12. Enter the Function mode.

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P.O. 3147
SANTA CRUZ, CA 95063
1(408) 427-3672

13. Set up the following data:

Some buttons have more than one function. For those buttons several values are listed.

```
(Button 2=poly)
(Button 3=12)
(Button 4= 0)
(Button 5 ="RETAIN")
(Button 6 = Off)
(Button 7 = 00)
(Button 8
          MIDI = 7
          DX = 7)
(Button 9
          AUX Patch = 000
          Main Patch = 000)
(Button 10
          MIDI CRV = LIN1
          DX CRV = LIN1)

(Button 11
          MIDI HI = 127
          MIDI LO = 000

          DX HI = 127
          DX LO = 000 )

(Button 12
          MIDI Shift = 0
          DX Shift = 0)

(Button 13
          Keymode = NORMAL
          Random Detune = 0)

(Button 14
          MIDI Transpose = 00
          Timbre = 63)

(Button 15
          MIDI HI key = 127
          MIDI LO key = 000

          DX HI Key = 127
          DX LO Key = 000 )

(Button 16
          MIDI Out Channel = 01)
```

Your DX7 should now be properly initialized...

ENJOY REV 2.xx!

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WARNING!!!

Be advised that all data that comprise the E! system (including the design of the E! board, the data embedded into the EPROMS, and this manual) are copywritten by GRey MAttEr REspOnsE, inc. Any attempt to copy or redistribute any part of the system by ANY means is an infringement of this copyright. Any such action will be dealt with to the fullest extent of the law.

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E! for the DX7: REV 2.xx General Operation

Since E!'s new features will change the operation of certain procedures on the DX7, we will now discuss the general operation of the DX7 when running E! software.

With E!, internal memory is increased from 32 voices, to a maximum of 576 voices divided up as per the following:

1) 256, or 320 internal RAM voices (amount depends upon the RAM Format selected).

2) 256 voice ROM Preset Library (optional, and at extra cost).

All voices have a huge array of function, and performance parameters that are stored as part of each voice. Of course, the cartridge slot may still be used as it is on a stock DX7, but with E! you have a second choice: By formatting a cartridge as a GMR cartridge, you may store 32 voices of voice AND function data on a single CRT. When using a YAMAHA format CRT one global set of function/performance data will be available to you.

When in the "Internal Play" mode, the DX-7's LCD screen will now read "Internal Bank x" or "PRESET BANK x" where x equals the bank number from which new voice changes will be chosen. Also while in this mode, the +/- buttons (and optionally the data entry slider) will adjust the bank number from which new voice changes will be chosen. Each time the bank number changes, the DX7's LED display will show "Ex" or Px" where x equals the bank number from which any new voice changes will be taken. This display remains for about 2 seconds before returning to the voice number display. While actually listening to an internal voice, the second line of the LCD will display "Ix-vv" or Px-vv" where x equals the bank number of the current voice, and where vv equals the number of the current voice.

E! allows you to completely redefine the tuning of the DX7's FM synthesizer. The microtonal system promises to open up whole new areas of experimentation for users of commercial synthesizers like the DX7.

E! constantly monitors the DX7's MIDI input for evidence of a sequencer or drum machine attached to your system. If it finds such evidence (MIDI clocks, MIDI sequencer on/off commands, Song Pointer data, or MIDI Time Code Data), E! will keep you track of various data concerning your sequencer/drum

machine. The dot in the lower right hand corner of the LED display will flash at the beginning of each MIDI beat. When you switch the DX7 into the Internal, or CRT modes, the first line of the LCD display will contain the following data:

If E! sees sequencer data:

1. "CRT" for cartridge voice, "I-x" or "P-x" for internal RAM , or preset voice where x equals the bank number from which future voice changes will be made.

2. "SEQSTOP" or "SEQPLAY" depending upon whether the sequencer is currently playing or not.

3. A beat number between 0000 and 9999.

If E! sees MIDI Time Code Data:

1. "CRT" for cartridge voice, "I-x" or "P-x" for internal RAM , or preset voice where x equals the bank number from which future voice changes will be made.

2. The current position value for MTC.

E! implements a series of filters that will allow you to selectively enable certain part of the incoming or outgoing MIDI data path, or the local keyboard system.

E! allows you to redefine the portamento pedal to do one of three jobs: Portamento, Device Control, and patch advance.

Each of these features will be explained in greater detail in later sections.

THE FUNCTION PAGES SYSTEM

E!'s many MIDI and function features are available through our "function pages" system. Under this system, you will use the function button to gain entry into the function pages, but you will then use the OP SELECT button to choose among the various pages. Here is a list of the function pages that are currently in place:

1. FUNCTION PAGE-- This is where portamento, pitch bend programmable volume and all controller data is set. Users of E! REV 1 will note that many new features have been added to this page, including many features that were previously part of the keyboard preset system, and many features that did not exist previously. Every parameter on this page may be stored with every voice. The operation of this page is very similar to a stock DX7's function page. When a voice is stored into internal RAM, all parameters from this page will be stored with the voice. When a voice is recalled from internal RAM, all parameters from this page will be recalled if you have set the DX7 to do so by using button 5 of the Physical Control Page.

2. MIDI PAGE-- On this page, you may choose MIDI channels for reception, transmission, and aux. transmission. MIDI input/output parameters and a patch map system for incoming patch changes are also available on this page.

3. MEMORY PAGE--MIDI bulk transmissions\ loading, storing, and erasing cartridges\ initializing voice memory\ and checking the battery level can be accomplished on this page.

4. SCALES PAGE-- E!'s microtonal capabilities are accessible through this page. Here you may quickly set up any scale with microtonal compilers, or you can adjust the pitch of each note independently to an accuracy of approx. 1/3 cent. Depending on the RAM format you choose for your DX7, you may also be able to store and recall scales from a bank of 16 available scales.

5. PHYSICAL PAGE-- Here you may set up filter configurations for MIDI input, output, and local control. Voice enables allow you to selectively activate only portions of E!. Other features such as control for the floating split interval, and controller re-definition are also available on this page.

The next 5 sections will describe these pages in greater detail.

THE FUNCTION PAGE

The first of E!'s function pages is the FUNCTION page itself. On this page, you may adjust all of the traditional function data, as well as the function data that makes your E!quipped DX7 different from everyone else's DX7.

Here is a map of the parameters that are available on the FUNCTION page:

Button Number	Function
1	E! version number display
2	Poly/Mono
3	Pitch Bend Range
4	Pitch Bend Step
5	Portamento Mode
6	Port/Gliss
7	Portamento Time
8	Volumes
9	Patches
10	Velocity Curves
11	Velocity Levels
12	Velocity Shifts
13	Keymode
14	TIMBRE/ MIDI Transpose
15	Key Limit
16	MIDI Out Channel
17	Modulation Wheel Range
18	Modulation Wheel Pitch
19	Modulation Wheel Amp
20	Modulation Wheel EG BIAS
21	Foot Control Range
22	Foot Control Pitch
23	Foot Control Amp
24	Foot Control EG BIAS
25	Breath Control Range
26	Breath Control Pitch
27	Breath Control Amp
28	Breath Control EG BIAS
29	After Touch Range
30	After Touch Pitch
31	After Touch Amp
32	After Touch EG BIAS

Those functions that correspond to functions on a stock DX7 will operate exactly as they do on a stock DX7, except that they are now programmable per voice. Therefore, please notice that when you make a change to function data on an internal voice, you must RESAVE that voice in order to make the changes permanent. Please also notice that you may disable the use of programmable function data with the function data parameter on the Physical page.

Here is an explanation of the functions that are only found on E!quipped DX7s:

Button 8-- Volumes This button has two functions; one for the DX7's volume, and one for the volume of your MIDI slaves. Each of these parameters has a range of 0 to 7. Please note that the MIDI volume parameter will be transmitted to your slaves with each voice change only when slave data is enabled on the Physical control page.

Button 9-- Patches This button has two functions; one for the patch number that will be transmitted to your MIDI slaves, and one for the patch number that will be transmitted over the AUX channel to your peripherals (mixers, reverbs, MIDI switchers, etc.). Both parameters allow you to access the entire range of 128 MIDI patches (0-127). These parameters will be transmitted over MIDI each time you change patches as long as you have enabled the transmission of patch changes. Please note that if you have enabled the transmission of SYS/EX data, FM voice data will be transmitted instead of the main patch number.

The next four buttons have to do with E!'s ability to dynamically process velocity information.

Button 10-- VEL CURVES This button has two functions; one for the velocity curve to be used by the DX7, and one for the velocity curve to be used by your MIDI slaves.

Here is a list of the velocity curves that are currently available:

1. **EXP1** This exponential curve will place the majority of its curve at the middle of the velocity scale.

2. **EXP2** This exponential curve will place the majority of its curve at the ends of the velocity scale.

3. **EXP3** This exponential curve will place the majority of its curve at the bottom of the velocity scale.

4. **EXP4** This exponential curve will place the majority of its curve at the top of the velocity scale.

5. **LIN1** This curve is identical to the DX7's original curve, except that it makes use of E!'s higher velocity resolution.

6. **LIN2** This is a straight linear curve.

Button 11-- Velocity Levels This button has four functions:

1. MIDI Velocity Upper Limit
2. MIDI Velocity Lower Limit
3. DX Velocity Upper Limit
4. DX Velocity Lower Limit

The functions of this button will work together with the velocity curve parameter, to provide total access to the DX7's Velocity Sensitivity.

Button 12-- Velocity Shifts This button has two functions: One for the amount of shift to apply to velocities on the DX7, and one for the amount of shift to apply to the MIDI slaves.

Button 13-- Keymode and Random Detune. This button has two functions. One will control the amount of random detune allowed in the system, the other will choose the current key assign mode.

ABOUT RANDOM DETUNE

Normally, when you play a note on the DX7, the tuning of that note is EXACTLY in tune, that is, there are never errors in intonation that might occur in acoustic music. E! helps this situation by allowing you to select a range of accuracy for the internal tuning system of the DX7. There are 5 ranges of random detune.

Range 0 duplicates the action of a stock DX7, that is, random detune is disabled.

Ranges 1 thru 4 will apply a random amount of detune to each note within a range of .341 cents (range = 1), to within a range of approx. 40 cents (range=4).

Please note that this parameter is greatly different than a normal detune in that EACH NOTE WILL HAVE ITS OWN DETUNE VALUE.

ABOUT KEY ASSIGN MODE

1. **Normal** This is the DX7's original key assign mode.
2. **Rolling** In this mode, notes will be alternated between the DX7 and the MIDI slaves.
3. **Flot HI** In this mode, any notes played by your right hand will be voiced by the DX7, while any notes played by your left hand will be voiced by your MIDI slaves. This is a "RIGHT HANDED FLOATING SPLIT" mode, which means that the split point will dynamically move up and down the keyboard as you play. Here's how the algorithm works:

   When a note is played in the right hand, E! will keep track of the highest note that is currently being played (notes being sustained by the sustain pedal don't count). Any notes within a certain interval down from this highest note will be judged to have been played by your right hand, while any notes below this "SOFT SPLIT POINT" will be judged to have been played be your left hand. The interval used for these calculations may be chosen on the Physical Control Page.

4. **TRK HI** In this mode, the highest current note will be sent to your MIDI slaves and played locally by the DX7. Other notes will be voiced only by the DX7 itself.
5. **LCL OFF** This mode will transmit all notes to MIDI only, and not voice the notes locally.

Please note that the key assign modes may be used in conjunction with the key limit function (button 15) to create many interesting effects. Here are a couple of examples:

1. Many users have requested a **FIXED SPLIT** mode. By using the normal key assign mode with key limit parameters, you may assign a fixed split anywhere in the MIDI key range. You may even assign a fixed split where the two sides of the keyboard overlap.

2. Other users have requested that the **TRACK HIGH** mode operate so that the MIDI note does not JUMP DOWN to the left hand when the right hand is released. With key limit, you may easily accomplish this by assigning the lowest note that should be MIDI'ed out.

Button 14-- TIMBRE/ MIDI Transpose This button has two functions; one for the timbre of the DX7's sound, and one for the transpose factor applied to all notes sent to MIDI.

TIMBRE -- With this parameter, you may easily scale the "BRIGHTNESS" of a sound without using the DX EDIT page. This parameter works by scaling the volume of only those operators that are modulators

MIDI TRANSPOSE -- If a MIDI TRANSPOSE is specified, and is different than the previous transpose, and the output of MIDI slave data is enabled on the Physical Control Page, E! will turn off all notes that are currently sounding, and re-transmit them with the new transpose factor.

Button 15-- Key Limit This button has four functions. They will set the high and low note limits for the DX and MIDI. The numbers that you see correspond to MIDI note numbers, which on a DX7 range from 36 to 96. There are three ways that E! may respond to data based on the settings of these parameters.

1. If LO limit and HI limit are equal, only one note will be active.

2. If LO Limit is lower than HI limit, there will be a central zone where notes are active.

3. If LO limit is higher the HI limit, then note ends of the keyboard will be active with a dead zone in the middle.

Button 16-- MIDI Out Channel This button allow you to specify the MIDI transmission channel that will be used while you are playing this patch. Any notes that are depressed on the keyboard at the time of the patch change will be shut off on the old channel, and then re-transmitted on the new channel. **This parameter may be disabled** on the Physical Control Page.

Button 17 Thru Button 32 will function as they do on a stock DX7, with the exception that the ranges of the controllers is now 0-15 instead of 0-99.

THE MIDI PAGE

E!'s MIDI page contains 8 parameters that allow you to tailor the DX7's MIDI implementation to suit your tastes. These parameters fall into three major groups:

1. MIDI Channel Selection
2. MIDI In/Out customization
3. MIDI In patch map parameters

MIDI Channel Selection allows you to selectively communicate with one or more pieces of MIDI equipment.

Button 1 controls the input channel number

Button 2 controls the output channel number. Please note that if you have enabled the changing of MIDI channels with each patch, this parameter will change as you change patches.

Button 3 controls the aux. output channel number. When changing patches, your aux. patch number will be transmitted to a pitch of aux. equipment. Please note, however, that this extra patch change command will only be transmitted if you have selected DIFFERENT CHANNELS for buttons 2 and 3.

MIDI In/ Out Customization

Button 7-- MIDI IN Parameters This button contains 7 parameters to tailor the MIDI input section.

GUITAR MODE places the DX7 into a special PSEUDO-MONO MODE in order to better facilitate the use of guitar controllers as a means of playing the DX7. This mode is a direct response to the requests of a number of guitar controller manufacturers for just such a mode. We have attempted to implement this feature to the DX7s fullest possible potential.

Bank Enable is used during the reception of Bulk data dumps in the GMR formats. When this parameter is enabled, incoming bulk dumps will automatically be directed to the memory bank requested in the GMR header. This will allow an external device to download data to fill all banks of RAM without any user intervention. If this parameter is disabled, incoming bulk dumps will be directed to the bank from which the current voice was loaded.

MODULE ENABLE is also used during the reception of bulk data in the GMR formats. When this parameter is enabled, you may send bulk data to one specific DX (or TX-TF Module) even though 2 or more DX/TX units are residing on the same channel of the same MIDI cable. This feature has tremendous potential for users of multi DX/TX MIDI setups who need the ability to download different voice data to each module.

RESET ENABLE is used to disable the reception of the MIDI reset byte. When the DX7 is switched on, this parameter will always be switched off, YOU SHOULD NEVER SWITCH IT ON UNLESS YOU ABSOLUTELY NEED THE ABILITY TO RESET THE DX7 OVER MIDI! When this switch is enabled, the reception of a MIDI reset byte (#FFH) will cause a total reset of the DX7. This is seen as an emergency procedure, since it will return the DX7 to the "Welcome to E!" message!

CONTROLLER MERGE ENABLE allows you to combine recognizable controller data that enters the DX7 through MIDI to be merged into the DX7's outgoing MIDI data stream as though the controller action had come from the DX7's own controllers. All Merged data will be transmitted on the same channel as the DX7s MIDI transmit channel. The sustain pedal cannot be merged with this parameter. When the KEY MERGE is enabled, however, the sustain pedal will automatically be merged.

SEQUENCER MERGE ENABLE allows you to combine any recognizable sequencer timing data that enters the DX7 through MIDI to merged into the DX7s outgoing MIDI data stream.

KEY MERGE ENABLE allows you to combine any KEY ON/ KEY OFF/ SUSTAIN PEDAL data that enters the DX7 through MIDI with data that comes from the DX7s local keyboard. This means that in addition to merging incoming key data into the DX7s outgoing MIDI data stream, you may use an external keyboard to drive the various key assign modes.

Button 8 MIDI OUT Parameters-- This button contains 5 parameters to tailor the MIDI output section.

SYSTEM EXCLUSIVE MODE only affects the transmission of MIDI bulk data. In the "DX" mode, only voice data will be present in MIDI transmit. In the "TX" mode appropriate function data will also be sent.

AFTER TOUCH MODE allows you to choose the type of after touch data that will be transmitted. In the "CONT" mode, after touch will be transmitted as controller #03H. In the "NORM" mode, after touch will be transmitted using the MIDI Status byte for Pressure Sensitivity.

KEY OFF MODE lets you set the status byte that will be used for transmission of key off data. In the "V=0" mode, key offs will be transmitted as key ons with a velocity of 0. In the "KEY OFF" mode, key offs will be transmitted as true key offs. Both modes are legal as far as MIDI is concerned, but you are advised to always use the "V=0" mode unless this mode cause problems with other equipment in your system.

RUNNING STATUS ENABLE sets the DX7 into a mode where redundant Status bytes are not transmitted whenever that is appropriate. This algorithm is updated for REV 2.xx, and will only skip status bytes when you play quickly enough to start clogging the MIDI data line.

ACTIVE SENSING ENABLE lets you decide whether or not MIDI active sensing will be transmitted out of the DX7's MIDI port. Normally, you will want this switch on, since it will help to quickly shut down your MIDI slaves in the event of a MIDI data problem (damaged MIDI cable, etc.). If, however, some of your equipment suffers side effects when listening to active sensing, you may disable it.

MIDI IN Patch Mapping control

This section allows you to control the manner in which the DX7 will respond to any voice changes it may receive over MIDI. Since MIDI allows a total of 128 patch change possibilities, E! includes this area so that you can re-direct ANY incoming patch changes into ANY OTHER patch number. For instance, you can tell the E! that any call to patch number 15 should be re-directed to the cartridge, voice number 3.

Button 11- **PATCH MAP NUMBER** lets you review the patch changes that are currently stored into memory. The number on the left of the LCD screen is the MIDI patch number that you are looking at, while the data on the right side of the LCD screen tells you how that patch number will be redirected.

Button 12- **PATCH MAP BANK** allows you to select the bank from which the patch will be selected. You may not select this button unless Internal memory protect is switched off.

Button 13 **PATCH MAP VALUE** allows you to select the voice number within the selected bank that will be selected. Once again, you may not select this button unless Internal Memory Protect is switched off.

THE MEMORY CONTROL PAGE

The memory control page contains parameters that are specific to the management of memory resources. Here is a list of the functions that are currently available.

Button	Function
1	MIDI Transmit of various data formats
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	Cartridge Format (GRey MAttEr or YAMAHA Formats)
15	Cartridge Save (GRey MAttEr or YAMAHA formats)
16	Cartridge Load (GRey MAttEr or YAMAHA formats)
17	Edit recall
18	Voice initialize
19	Initialize memory types
20	Choose RAM Format
21	
22	
23	
24	
25	
26	
27	
28	
29	
30	Read Battery Level
31	Memory Protect INT/CRT
32	Read E! Revision number

Button 1-- MIDI Transmit. This button provides a quick, and easy way to transmit data to another piece of equipment. Simply press button 1 until the correct data type appears on the screen, and press "yes". Here is a list of the data types supported by this button:

1. **TRANSMIT VOICE BANK** This option will transmit the bank whose number shows on the bottom line of the LCD during the LIVE modes. If the SYSMODE parameter (MIDI Page button 8) is set to "TX", voice and function data will be transmitted. If not, voice data only will be transmitted.

2. **TRANSMIT DX STATUS** This option will transmit the incoming patch map data, and then the physical preset data.

3. **TRANSMIT SCALE** If you have your RAM formatted for scale storage, then all 16 scales will be transmitted. Otherwise, the current scale edit buffer will be sent.

Any of these formats is available regardless of whether MIDI is set up to allow sys/ex messages at the time of the request.

Button 14- CRT FORMAT allows you to create cartridges that are blank, that is, cartridges where all 32 slots are filled with "INIT VOICE". In order to access this button you must use button 31 to disable CRT Memory Protect.

Two formats are available:

YAMAHA FORMAT is completely compatible with the format that YAMAHA uses for DX7 cartridges. CRT's that are formatted in this way may be transported to any DX7.

GMR FORMAT is a special format that allows E!quipped DX7s to store **function data and voice data** for an entire bank of voices on a single CRT!! CRTs created with this format can be used to quickly backup your E! voices, and you may transport these CRTs to any E!quipped DX7, but these CRTs may not be used with stock DX7s until they are re-formatted as YAMAHA CRTs.

Button 15- CRT Save will take the internal voice bank that you are currently LISTENING TO, and transfers it to the CRT. This procedure will automatically sense the

format of the CRT in the slot. If the CRT is formatted as a GMR CRT, voice and function/performance data will be stored to CRT. If the CRT is formatted as a YAMAHA CRT, only voice data will be written to CRT. Memory Protect CRT must be removed before this function may be accessed.

Button 16-- CRT LOAD This function will take the data that is on the CRT, and transfer it to the Internal voice bank that YOU ARE LISTENING TO. If the CRT is formatted as GMR, voice and function data will be transferred into memory. If the CRT is formatted as YAMAHA, only voice data will be read, and the function/ performance data will be read from the DX7's special set of function data that is held for CRT voices.
Therefore, you may preset the function data of all 32 voices for a bank of RAM simply by setting up the desired data on the function page while LISTENING to a cartridge voice before loading the cartridge into memory.
In order to access this function, INTERNAL MEMORY PROTECT must have been previously removed.

Button 17-- Edit Recall. This function will recall the last voice that was edited. Unlike stock DX7s, E! will not place you into the edit mode after this procedure is complete.

Button 18-- Voice INIT This button will call a special "STARTING POINT" to aid in the creation of voices.

Button 19--Data Erase. This button allows you to selectively erase a specific type of data that is stored within the DX7. All formats require that Internal Memory Protect be removed prior to erasure.

Here is a list of the data types that are currently available for initialization:

PATCH MAP IN will erase the reception patch map so that incoming patch changes will emulate the action of a stock DX7.

PHYSICAL PRESET will erase the 16 physical presets.

BANK ERASE will erase the internal voice bank the you are LISTENING to.

Button 20-- RAM Format This parameter allows you to select the current format of the DX7's internal RAM. The two choices are:

1. Voice mode. In this mode, voice storage is available for 320 internal RAM voices including function/performance parameters.

2 Scale Mode. In this mode, voice storage is divided so that you may store 256 Internal RAM voices AND at the same time store 16 microtonal scales.

Please note that whenever you change the internal RAM format, some data will be lost. When switching from voice mode to scale mode Banks 8 and 9 will be destroyed. When switching from scale mode to voice mode all 16 microtonal scales will be destroyed.

You may only change this format if the Internal Memory Protect is removed.

Button 30-- Read battery level

Button 31 Memory protect-- Both Internal , and Cartridge may be set, and reset with this button.

Button 32-- Version number of your E! EPROMS.

THE SCALES PAGE

Microtonality has proved to be one of the most important new features of E! REV 2. It is this page that allow you to access the microtonal capabilities of the DX7. This page includes a number of "SCALE COMPILERS" that will make it easier to create, and modify the DX7's scale.

Here is a list of the functions that are available on this page:

Button	Function
1	Adjust note number
2	Adjust note octave
3	Adjust note value
4	Reset Scale (load DX Original scale)
5	12 tone scale w/programmable offsets
6	
7	Base frequency Equal Tempered
8	Notes per octave Equal Tempered
9	Equal Tempered Compiler
10	Quarter Tone Compiler
11	
12	
13	
14	
15	
16	
17	
18	
19	
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Please note that this manual is not meant to be an authoritative tutorial on the subject of microtonal music, or alternative temperaments in music. This manual is only meant to show you how to access the features of E!'s Scale Control Page.

Before explaining the function of each button on this page, here is a little background on the internal scale system that drives the DX7, and therefore drives E!'s microtonal capabilities:

Internally, the DX uses a scale with 4096 notes per octave. All functions relating to portamento, Pitch EG, and master Tune are expressed to YAMAHA's LSIs in terms of this 4096 note-per-octave scale. In order to implement microtonality on the DX, we have given you direct access to the mechanisms that translate a note into the DX's internal scale.

E!'s RAM storage can be configured in one of two ways:

Voice mode puts all available Ram to the task of storing DX7 Voice and function data. This allow you to store 320 voice into your DX7 internally. While in this mode, you may experiment with microtonal scales, but you may not store them to RAM for future recall.

Scale mode necessitates that you give up 64 internal voices in order to store 16 different microtonal scales at a time.

Please note that changing the RAM format of the DX7 will cause all data in the re-formatted RAM to be destroyed. This means that when changing from voice mode to scale mode, Voice Banks 8 & 9 will be destroyed. When changing from scale mode to voice mode, all currently stored microtonal scales will be destroyed.

Whether you keep the DX7 in the voice mode or the scale mode you may experiment fully with the microtonal system.

Here is a brief explanation of the function of each of the buttons on E!'s Scale Control Page:

Buttons 17 to 32-- Choose a Scale When you have the DX7 in the microtonal mode, you may store finished scales into any one of sixteen scale locations. Buttons 1 to 16 will help you to do this.

TO STORE A SCALE

In order to store a microtonal scale, the following conditions must be true:

1. E! must be in the microtonal mode (Memory Control Page, button 20)

2. Internal memory protect must be off.

Presuming that these conditions have been met, the procedure for storing a microtonal scale is simple:

1. Press and hold the store button while in the scales page (The top line of the LCD screen should read "STORE SCALE").

2.Press the button corresponding to the scale location where the scale should be stored (button 17= scale 1, button 32 = scale 16, etc.).

Your microtonal scale is now stored into memory for future use.

MICROTONAL COMPILERS/ADJUSTERS

In order to create microtonal tunings for the DX7, you will use the tools provided on buttons 1 through 16. These tools should allow you to create most any scale imaginable.

Individual note adjustment

Buttons 1,2, and 3 allow you to adjust the pitch each individual note one at a time.

Button 1-- Adjust note number.

Button 2-- Adjust note octave

Button 3-- Adjust note Value This button has two functions. One is for the coarse adjustment of the pitch and one for the fine adjustment of the pitch.

Scale reset

Button 4 will load the DX7's "normal" scale into memory (Twelve tones, equal tempered).

Please note that the scale that is called by this routine is YAMAHA's "normal" scale, and NOT a perfectly tempered Scale. In order to call up a perfectly tempered scale to use as a

starting point for further experimentation, you should use the equal tempered compiler to create a scale with 12 tones per octave, and an offset of 00000.

Offset Compiler

Button 5 will allow you to set specific offsets for each of the twelve tones of the "Normal" scale. While adjusting these offsets, the LCD will tell you the name of the note that you are adjusting (i.e. "A#"), the range of the adjustment that you are making (f for fine, c for coarse), and the current offset of that note. To select a note in this mode, you may repeatedly strike button 5, or you may use the +/-buttons. The offset will be adjusted with the data entry slider. In this mode, all octaves are adjusted simultaneously.

Equal Tempered Scales

Buttons 7, 8, and 9 will allow you to set up equal tempered scales with more, or less than twelve tones per octave. In this mode, you should specify the base pitch of the scale and the number of notes per octave before striking button 9 to compile the results.

Button 7--Scale Base This parameter allows you to specify the starting point of the scale. This parameter is extremely important because it allows scales with many notes per octave to be played in a useful range from the DX7's keyboard.

Button 8--Notes per octave

Button 9--Equal Tempered compiler. This button will activate the data that you request with buttons 7, and 8.

Quarter Tone Scales

Button 10 allow you to quickly, and easily set up scales where one or more of the 12 tones by exactly a quarter tone. While using this compiler, you will use button 10, or the +/- buttons for the selection of the current tone to adjust, and you will use the data entry slider to adjust the value of the note

Converting GMR points into cents is a very easy procedure. This simple equation will convert cents to points:

```
Points=(Cents/1200)*4096
       |     |    |
       |     |    +number of points per
       |     |     octave
       |     |
       |     +number of cents per
       |      octave
       |
       +number of cents to convert
```

Converting cents to GMR points is equally easily; here is the equation:

```
Cents=(Points/4096)*1200
      |      |     |
      |      |     + number of cents per octave
      |      +number of points per octave
      +number of points to convert
```

THE PHYSICAL CONTROL PAGE

It is this page that allows you to adjust the various physical filters of the E! system. This page also includes the Master Tune adjustment.

Here is a list of functions that are available on this page.

Button	Function
1	Master Tune
2	MIDI in filters
3	MIDI out filters
4	Local Control filters
5	Voice Enables
6	
7	MIDI In Velocity Shift
8	Data Entry Slider Mode
9	Floating Split Interval
10	Pedal 2 Mode (Portamento Pedal)
11	Controller Assignments
12	Current Scale
13	
14	
15	
16	Module Number
17	
18	
19	
20	
21	
22	
23	
24	
25	
26	
27	
28	
29	
30	
31	
32	

Button 1-- Master Tune This button allows you to adjust the overall pitch of the DX7. With E!, you will notice that a value display has been added to this parameter. Each point of value is equal to approximately 1/3 cent.

Button 2-- MIDI In Filters This button has 8 functions. Each function allow a specific part of any incoming MIDI data to be ignored. For instance, when "PROG" (program change) is turned off, any program changes that are received over MIDI will be ignored by the DX. Here is a list of the Filters that are available:

1. System Exclusive messages
2. Sustain Pedal movement
3. After Touch Movement
4. Modulation Wheel Movement
5. Breath Control
6. Foot Controller Movement
7. Pitch Bend Movement
8. Program Changes

Button 3-- MIDI Out Filters This button has 8 functions Each functions allows a specific part of any of the **OUTGOING** MIDI data to be filtered (not transmitted). For instance, when "PROG" (program change) is turned off, any voice change commands that are made from the DX's local keyboard will be used locally, but not transmitted over MIDI to your slaves. Here is a list of the output filters that are available:

1. System Exclusive messages
2. Sustain Pedal movement
3. After Touch Movement
4. Modulation Wheel Movement
5. Breath Control
6. Foot Controller Movement
7. Pitch Bend Movement
8. Program Changes

Button 4-- LOCAL FILTERS This button has 7 functions. Each function allows a specific portion of the DX's local facilities (Wheels, Pedals, Program change buttons) to be ignored by the DX7, and only transmitted over MIDI (presuming that the same portion of data is not filtered for output). For instance, when "PROG" (program change) is turned off, the program change buttons will have no effect on the voice that the DX7 is playing, but a voice change command will still be transmitted over MIDI. Here is a list of the filters that are currently available:

1. Sustain Pedal movement
2. After Touch Movement
3. Modulation Wheel Movement
4. Breath Control
5. Foot Controller Movement
6. Pitch Bend Movement
7. Program Changes

Button 5-- Voice Enables When you first start out with E!, you may find it useful to disable certain portions of the data that is recalled with each voice. This button will allow you to do just that. For instance, until you become familiar with programmable function data, you may wish to use this parameter to disable that data. Here is a list of the types of data that may be enabled/disabled:

MIDI OMNI ENABLE Allows the DX7 to receive ALL incoming MIDI data regardless of the channel assigned to that data.

MIDI Echo ENABLE determines whether notes played on the DX7's internal synthesizer will be echoed over MIDI channel 1 to an auxiliary MIDI slave. Please note that this function is ONLY available if you have set the main MIDI transmit channel to a value other than 1.

DX STACK determines whether or not notes that are sent to the DX7's internal synthesizer will be voiced on two FM channels simultaneously. When combined with random detune (Function Page, Button 13), DX Stack will allow you to simulate a random chorus effect on each note. Please note that use of this feature will decrease the number of notes playable at one time to 8.

OUT DATA -- When you change patches, E! will attempt to transmit an initial MIDI volume setting for that patch. You may use this parameter to disable that transmission.

OUT CHANNEL -- When you change patches, E! will attempt to change the MIDI transmission channel in order to communicate with the correct slave for each patch. If you do not wish the DX7 to change its own MIDI channels, you may disable that action with this parameter.

VEL DATA If you disable Velocity Processing, The DX7 will automatically choose the "Normal" Velocity curve each time you change patches. When this parameter is disabled, you may not adjust the parameter located on the Function Page, Button 10.

FUNCTION DATA -- Determines whether programmable function data is enabled. When this data is disabled, the global function data set will be called every time a patch is changed.

Button 7-- MIDI input Velocity Shift lets you choose a value that will be subtracted from the velocity of any notes that are received through MIDI. You may use this parameter to alter how "hard" a sequencer, or external master controller drives the DX7.

Button 8-- Data Entry Slider Mode allows you to choose the mode of operation for the data entry slider. Here is a list of the modes that are supported:

MIDI VOLUME lets you use the data entry slider to control the volume of any remote equipment that allows the reception of the master volume controller (controller #07h). THE DX7 IS NOT AFFECTED BY DATA ENTRY SLIDER MOVEMENTS WHILE IN THIS MODE.

BANK NUMBER lets you use the data entry slider to choose internal (and preset) banks of memory. Any future voice changes will be taken from the bank that you select with the data entry slider in this mode. NO MIDI DATA IS TRANSMITTED IN THIS MODE.

PORTAMENTO TIME allows you to use the data entry slider to control the portamento time.

CONTROL 08 lets you define the data entry slider as controller #08h.

CONTROL 09 lets you define the data entry slider as controller #09h.

TIMBRE lets you control the "timbre" of the DX7 with the data entry slider.

DATA SLIDE lets you define the data entry slider as a data entry slider for MIDI transmission. Use this mode if your external equipment must be controlled by the data entry slider controller.

MOD WHEEL turns the data entry slider into a modulation wheel.

FOOT CONTROL turns the data entry slider into a foot controller.

BREATH CONTROL turns the data entry slider into a breath controller.

Button 9-- Floating Split Interval. When in the floating split mode, E! looks for the top note that you are playing, and counts down from that note in order to determine the split point. With this parameter, you may choose the split interval.

Button 10 -- Pedal 2 Mode allows you to choose the mode of operation of the DX7's "PORTAMENTO PEDAL" Here is a list of the modes that are currently available:

PORTAMENTO allows pedal 2 to operate it the same way that it operates on a stock DX7.

CONTROL allows pedal 2 to work in conjunction with the voice select buttons to achieve a number of useful features. Here is a map of the functions that are available in this mode

Button	Function
1	Choose preset 1
2	Choose preset 2
3	Choose preset 3
4	Choose preset 4
5	Choose preset 5
6	Choose preset 6
7	Choose preset 7
8	Choose preset 8
9	Choose preset 9
10	Choose preset 10
11	Choose preset 11
12	Choose preset 12
13	Choose preset 13
14	Choose preset 14
15	Choose preset 15
16	Choose preset 16
17	Sequencer Start
18	Sequencer Stop
19	Sequencer Continue
20	
21	
22	
23	
24	
25	
26	
27	
28	
29	
30	
31	
32	Panic Button (send all notes off)

TO SAVE PRESET, PUSH STORE while in Physical Page

Concerning the sequencer start/stop commands:

When you choose the sequencer start/stop/continue commands, E! will simply transmit a MIDI sequencer start/stop/continue command out through its MIDI port. It is the responsibility of your other MIDI equipment to accept these commands in the absence of MIDI clock pulses. GRey MAttEr REspOnsE have made no effort to test this feature with every sequencer/drum machine/computer software package on the market. Nor do we warrant that this feature will work with any specific instrument.

ADVANCE This mode allow you to use pedal 2 to advance through the DX7s internal incoming patch map. Each time you press pedal 2, the next entry in the patch map will be selected. While in the "live" mode, you may press the button that is marked "INTERNAL MEMORY PROTECT" (the button directly over the Internal Memory Play button) to reset the current patch map pointer to "0".

Please note that if you turn the DX7 on without a pedal in the jack marked "PORTAMENTO PEDAL", E! will automatically reset this parameter to "PORTAMENTO".

Button 11-- Controller Definitions This button contains 3 parameters that allow you to configure your controllers to perform any of the listed functions. The three controllers that can be re-configured are: **MODULATION WHEEL**, **FOOT CONTROLLER**, and **BREATH CONTROLLER**. Here is list of functions that you may choose for each controller:

MIDI VOLUME lets you use the controller to control the volume of any remote equipment that allows the reception of the master volume controller (controller #07h). THE DX7 IS NOT AFFECTED BY CONTROLLER MOVEMENTS WHILE IN THIS MODE.

CONTROL 08 lets you define the controller as controller #08h.

CONTROL 09 lets you define the controller as controller #09h.

TIMBRE lets you control the "timbre" of the DX7 with the controller.

DATA SLIDE lets you define the controller as a data entry slider for MIDI transmission. Use this mode if your external equipment must be controlled by

the data entry slider controller.

MOD WHEEL turns the controller into a modulation wheel.

FOOT CONTROL turns the controller into a foot controller.

BREATH CONTROL turns the controller into a breath controller.

Button 12-- Current scale number When you format your Internal RAM memory in the Scale mode you may store a scale number with each physical preset. When you change physical presets in the LIVE state, the scale number that you select with this parameter will be loaded. If your RAM is not in the scale mode, you may not access this switch.

Button 16-- Module number When sending, or receiving bulk data in the GRey MAttEr REspOnsE formats, a special module number parameter is available to direct data into only one FM Tone module, even though many modules may co-exist on the same MIDI channel. You may use this parameter to select the module number that the DX7 will respond to.

THE PHYSICAL PRESET SYSTEM

In a live performance situation, you may need to quickly change the parameters on the physical control page. To accomplish this, you may use the physical preset system. The physical preset system allow you to simply set the physical parameters the way you want them, and store them into one of 16 registers for future recall. While the DX7 is in the LIVE state, you may recall these presets by simply holding down the portamento pedal while in the control mode, and press one of the first sixteen voice numbers. The LCD panel will inform you of the recall.

Here is a list of the parameters that are programmable with the physical preset system:

MIDI In filters (button 2)
MIDI Out filters (button 3)
Local Control filters (button 4)
Voice Enables (button 5)
MIDI In velocity shift (button 7)
Data entry slider mode (button 8)
Split interval (Button 9)
Controller definitions (button 11)
Current scale number (button 12)

Please note that not all parameters that are on this page are available on the preset system.

The Optional ROM Preset Library

When E! was originally designed, much room was left on the board for expansion ROMS, and extra RAM was placed on the board, even though we had no idea what to do with this extra RAM. It is this extra ROM and RAM space that makes REV 2.xx itself possible.

One of many enhancements to the system is that the E! board will now support the placement of voices on Eprom for greatly increased storage capacity. In order to use this extra capacity, you need to take one of the following steps:

1. Purchase a pre-programmed ROM from software developers

2. Order a custom ROM from GRey MAttEr REspOnsE, inc. in the US, or from your distributor worldwide.

3. Use an Eprom Programmer to burn your own Eproms

If you wish to order a custom ROM:

Here is the procedure to order a ROM from GRey MAttEr REspOnsE, inc. in the US (Check with your distributor for custom programming outside the US.):

1. Program the sounds that you want on the ROM **EXACTLY** as you wish them to appear on the ROM. This means that ALL DATA ON THE FUNCTION PAGE MUST BE SET EXACTLY!! GRey MAttEr REspOnsE,inc. will assume no responsibility for changes made to a ROM after the initial programming!

2.Transfer the data from 8 banks of the DX7 to a transfer medium. Grey MAttEr REspOnsE, inc. will currently accept the following formats:

    1. RAM cartridges which, naturally, Grey MAttEr REspOnsE, inc. will return after the completion of the programming.

    2. MIDI data stored on a disk made with SYS/EX Software for the IBM.

    3. More formats may become available as voice editors appear on the market that support the advanced features of E!. Please check with GMR for any new formats.

3.Send the medium to GRey MAttEr RespOnsE, inc. for processing. BE SURE TO INSURE THE PACKAGE, AS AGAIN , GMR WILL NOT ASSUME RESPONSIBILITY FOR CARTRIDGES THAT ARE LOST IN THE MAIL!

Be sure to include payment for all processing, and shipping fees when you send us your voices, as CODs will not be accepted!

Note to DX Voice Software developers:

After receiving your ROM voice library, you may consider yourself free to make unlimited copies of that ROM for resale. But, please note that if you have included voices for which copyright has been claimed, you will assume full responsibility for any action brought against you by the voices' original developer. In this matter GMR acts only as a service for hire for the purpose of creating a voice ROM. Piracy is Wrong, and we will not knowingly be a part of it!

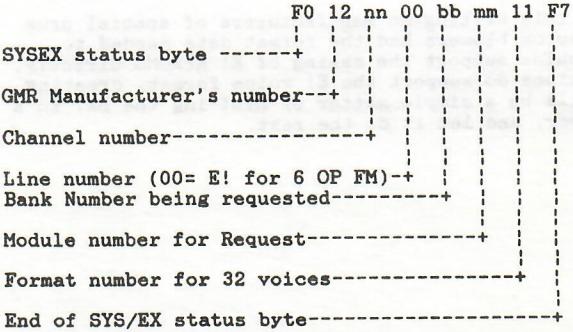
If you wish to create your own voice ROM, you should read this section very carefully, although once you become familiar with the procedure, you will find it to be rather simple:

1. Retrieve 8 banks of voices from the DX7. In order to do this, you must send the DX7 a series of MIDI commands, and record the data that returns from the DX7. You may do this by writing a simple program in BASIC, or any other suitable language. First, you will send the DX7 bulk dump request for the first bank that you want. As soon as the bulk dump request has been sent the DX7 will begin to transmit the selected bank of voice data in the GRey MAttEr REspOnsE format. This format is an exact image of voice as it is stored in RAM in the DX7. This means that all FUNCTION/ AND PERFORMANCE DATA ARE ALREADY IN PLACE. You only need to convert each pair of nibbles that comprise a byte of data, back into a byte before converting the data into a format that your EPROM programmer will understand (usually intel HEX format).

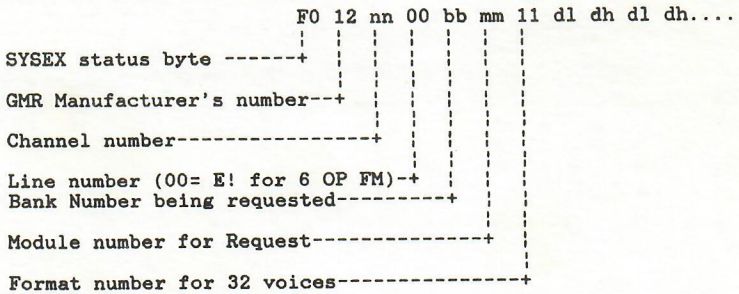
Now simply repeat this procedure for 7 more banks.

i.e.

Send the DX7 this string (make sure that SYSEX in is enabled, and that the DX7 is in the bank mode.)


F0 12 nn 00 bb mm 11 F7
SYSEX status byte
GMR Manufacturer's number
Channel number
Line number (00= E! for 6 OP FM)
Bank Number being requested
Module number for Request
Format number for 32 voices
End of SYS/EX status byte

This data will be returned:


F0 12 nn 00 bb mm 11 dl dh dl dh....
SYSEX status byte
GMR Manufacturer's number
Channel number
Line number (00= E! for 6 OP FM)
Bank Number being requested
Module number for Request
Format number for 32 voices

dl= LOW nibble of data byte
dh= HIGH nibble of data byte

There will be 8192 bytes of nibble encoded data, followed by a checksum, which you should check using the same algorithm that you would use to check a YAMAHA checksum.

To decode the Data bytes, simply read in two data bytes, then apply this formula to them

COMPLETE_DATA_BYTE =

(DATA_BYTE_1 AND 15)+((DATA_BYTE_2 AND 15)*16)

After decoding all 8192 data bytes you will probably need to convert this data to intel Hex code for transfer to your eprom programmer.

At the time of this writing no manufacturers of special drum machine style eprom blowers had the format data needed to allow their machine support the making of E! EPROMS directly. When these machines do support the E! voice format, creating an E! Eprom will be a simple matter of MIDI-ing the DX7 to a MIDI EPROM blower, and let it do the rest.

MIDI IMPLEMENTATION

Reception Data

Channel Voice Messages- The DX7 will respond to channel messages as usual, with the exception that OMNI mode is available, and MONO mode is available with each of the 16 voices on the DX7 being assigned to a different MIDI channel.

MIDI Guitar Mode Several MIDI Guitar controller manufacturers use a special MIDI mode to allow the six strings of the Guitar to tracked more accurately. When using this mode, MIDI's basic key on/off rule (the number of key offs MUST match the number of key ons) is no longer obeyed. By putting the DX7 into the MIDI guitar mode (MIDI page button 8), you will be able to use guitar controllers in this mode.

KEY OFF

Status	1 0 0 0 n n n n	n=channel number
Key Number	0 k k k k k k k	k=key number
Velocity	0 v v v v v v v	v=Velocity (ignored)

Key On

Status	1 0 0 1 n n n n	n=channel number
Key Number	0 k k k k k k k	k=key number
Velocity	0 v v v v v v v	v=0, KEY OFF v=1-127 KEY ON

All incoming KEY ON Velocities will be processed by the current setting for MIDI in velocity shift.

Control Change

Status	1 0 1 1 n n n n	n=channel number
Control No.	0 c c c c c c c	c=controller number
Value	0 v v v v v v v	V=controller value

The following controllers will be received if that controllers's switch is enabled.

c = 1	Modulation Wheel
c = 2	Breath Controller
c = 3	After Touch
c = 4	Foot Controller
c = 5	Portamento Time
c = 7	Volume
c = 64	Sustain Pedal
c = 65	Portamento Pedal

Please Note that controllers arriving over MIDI ARE NOT REMAPPED ACCORDING TO THE CONTROLLER MODES SET ON E!'s PHYSICAL CONTROL PAGE!!

Program Changes

Status	1 1 0 0 n n n n	n=channel number
Patch number	0 p p p p p p p	p=patch number

Incoming Patch changes are always sent through E!'s input patch map, which may be altered using the MIDI page buttons 11,12 and 13.

After Touch

Status	1 1 0 1 n n n n	n=channel number
Pressure	0 p p p p p p p	p=Pressure

Pitch Bend

Status	1 1 1 0 n n n n	n=channel number
Value LSB	0 L L L L L L L	L=lower byte
value MSB	0 m m m m m m m	m=Greater Byte

System Realtime Messages

Active Sensing

Status	1 1 1 1 1 1 1 0

MIDI Clock

Status	1 1 1 1 1 0 0 0

Sequencer Start

Status	1 1 1 1 1 0 1 0

Sequencer Continue

Status	1 1 1 1 1 0 1 1

Sequencer Stop

Status	1 1 1 1 1 1 0 0

System Common Message

Song Pointer

Status	1 1 1 1 0 0 1 0
Value LSB	0 L L L L L L L
Value MSB	0 m m m m m m m

MIDI Time Code

1/4 frame messages and full messages will be recognized and used for display of MTC value on the LCD.

System Exclusive Data

With E!, Your DX7 will respond to, and transmit system exclusive data in two complete formats:

1. YAMAHA Formats provide for compatibility with Editors, and librarians that are intended for stock DX7s.

2. GRey MAttEr REspOnsE Formats provide for access to the advanced functions of the E! system.

The YAMAHA formats are well documented by YAMAHA, and therefore will not be explained here. For more information of the YAMAHA formats, please refer to the SERVICE MANUALS for the "X" series instruments (THE TX7 Manual is quite complete).

The GRey MAttEr REspOnsE System Exclusive Data Format

Our SYSEX formats include a number of features that will help you to better organize your MIDI setup. Before going into detail on the various formats that are available, here is a quick overview of the format header, which is a part of ALL GMR SYSEX transmissions:

Status	1 1 1 1 0 0 0 0	
GMR ID number	0 0 0 1 0 0 1 0	12(HEX)
Channel	0 0 0 0 n n n n	n=channel number
Line	0 0 0 0 0 0 0 0	00= E! for 6 OP FM
Module Number	0 n n n n n n n	m=Module (see *1)
Bank Number	0 b b b b b b b	b= bank (see *2)
Format Number	0 f f f f f f f	f= format number
data byte 1	0 d d d d d d d	---+
data byte 2	0 d d d d d d d	|
	*	|
	*	|
	*	|
	*	|--See *3
	*	|
	*	|
	*	|
data byte n	0 d d d d d d d	---+
Checksum	0 c c c c c c c	(Only for Bulk DATA)
EOX	1 1 1 1 0 1 1 1	

*1: Module number refers to the ability to have multiple

DX7s (or TX Units) on the same MIDI channel, while still retaining the ability to send SYSEX data to each unit separately. When the module mode (on the physical control page) is enabled, E! will only respond to GMR SYSEX data if that data's module number matches the module number you set of the physical control page. For example, this parameter could be used to alter the temperament of one module of a TX rack even though all units are playing off of the same channel.

*2: Bank number refers to the ability to direct certain types of bulk data (currently DX voice data) to a specific BANK of memory. For example, a patch librarian could use this feature to load all banks of internal memory without any action from you. You must enable this parameter of the physical control page, otherwise all bulk data will be sent to the current bank, regardless of the bank number in the data.

*3 For all bulk data formats, data bytes are used to figure a checksum. To simplify the task of programming, you will find that our method of figuring checksums is identical to the method used in the YAMAHA formats. Checksum Error detection is provided in the GMR formats only so that you will be warned when there is an error. Since bulk dumps usually include a large amount of data, incoming data must be stored into memory as it arrives, making it impossible to "UNDO" a bulk dump whose checksum is found to be incorrect.

Please note that the GMR formats DO NOT REQUIRE HANDSHAKING OF ANY KIND! This eliminates the need to always have a bi-directional link between your computer, and your instruments.

The following types of data may be exchanged using the GRey MAttEr REspOnsE Formats:

1. Bulk Voice Data in the GMR Format includes all of E!'s function data (Key limiting, Random Detune, MIDI Transpose, Key mode, etc.), as well as all of the YAMAHA function DATA (Port Time, Etc.).

2. Bulk Scale Data allows an E! quipped machine to send/receive Microtonal scale tables over MIDI.

3. E! Specific parameter data allows you to change a single parameter, or a single group of related parameters of the system.

4. Bulk Dump Requests allow a remote computer to demand the transmission of any of E!'s bulk data formats.

Here is a list of the formats that are recognized by the DX7:

Bulk Dump Formats

Format 00h	Single voice/function bulk dump.
Format 01h	32 Voice/function bulk dump.
Format 02h	Single Microtonal Scale Bulk Dump
Format 03h	16 Microtonal Scale Bulk Dump
Formal 04h	DX Status Block

Bulk Dump Requests

Format 10h	Single voice/function bulk dump request
Format 11h	32 voice/function bulk dump request
Format 12h	Single Scale bulk dump request
Format 13h	16 Scale bulk dump request
Format 14h	DX Status Block bulk dump request

Parameter Formats

Format 40h	Function Parameters
Format 41h	Physical & MIDI parameters
Format 42h	Scale Parameters
Format 43h	Load Command for physical presets

Bulk Data

Voice Data

Two types of dumps are available: One for the data for a single voice, and one for the data for a set of 32 voices. These formats are quite cryptic, and are not meant for use with editors that will wish to alter the data and send it back to the DX7. Instead, these formats are meant primarily for the quick transfer of voice data to/from Off-line storage machines such as a QX-1 Sequencer, or a JLCooper MIDI Disk. Formats geared

TO UPLOAD OR DOWNLOAD, put SYS/EX ON
FOR Input & OUTPUT
make sure MIDI FN=MIDI OUT
CHANNEL 2

toward ease of alteration will follow later in this section.

Single Voice format = 00
256 Data Bytes

32 Voices format = 01
8192 Data Bytes

Please note that the data presented in Format 01 is identical to E!'s internal data storage format. Therefore, using this data to create a preset voice ROM for the DX7 is a fairly straightforward process. See The section entitled "Making Voice ROMs" for more details.

Microtonal Scale Data

Two Types of scale transfers are available; one for the transfer of a single scale, and one for the transfer of a group of sixteen scales.

Both formats use the same notation for the value of a pitch:
Internally, pitch is represented as a four bit number for the octave of the pitch, and a 12 bit number representing the position of the pitch within that octave (E! refers to position as a number of points above the even octave).

For bulk data representation, the first byte sent is the octave.

The second byte contains the Most significant nibble of the position

The third byte contains the Next Most significant nibble of the position

The fourth byte contains the Least significant nibble of the position

When the least significant nibbles of each of the four bytes are assembled as shown below, the resulting 16 bit number will equal the pitch value.

Byte 1	x	x	x	x	1	1	1	1
Byte 2	x	x	x	x	2	2	2	2
Byte 3	x	x	x	x	3	3	3	3
Byte 4	x	x	x	x	4	4	4	4

After Assembly:

Pitch Value: 1 1 1 1 2 2 2 2 3 3 3 3 4 4 4 4

1 Scale Format = 02
512 data bytes

16 scales Format = 03
8192 data bytes

DX Status Data

With this single data format you can save and load the internal registers of the DX7 that determine its operating characteristics. Here is a summary of the data included in this format

THIS FORMAT WILL IGNORE THE MODULE NUMBER, AND BANK NUMBER PARAMETERS!

Section one of this format is the Patch map that remaps all patch changes being received over MIDI. This patch map may also be used is conjunction with the portamento/control/patch advance pedal to move to a predefined patch.

The patch map consists of one two-byte code for each of the 128 MIDI program change possibilities.

The first byte is the bank number where:

0 = Preset Bank 1
1 = Preset Bank 2
2 = Preset Bank 3
3 = Preset Bank 4
4 = Preset Bank 5
5 = Preset Bank 6
6 = Preset Bank 7
7 = Preset Bank 8
8 = Cartridge
9 = Internal Bank 0
10 = Internal Bank 1
11 = Internal Bank 2
12 = Internal Bank 3
13 = Internal Bank 4
14 = Internal Bank 5
15 = Internal Bank 6
16 = Internal Bank 7
17 = Internal Bank 8
18 = Internal Bank 9

All requests to nonexistent banks (CRT not ready, Presets not installed, etc.) will automatically be mapped onto Internal Bank 1

The Second byte is the patch number where

Patch = 0-31

Only the first 5 bits of the bank number will be used for the patch number, higher bits will be masked out automatically.

The Total number of data bytes for the patch map section is 256 bytes.

After the Patch map section is complete, the contents of the 16 keyboard presets will be received.

Each preset is transmitted as 16 bytes of MIDI data whose lower nibble are assembled to form 8 byte of data. The least significant nibble is transmitted first, the most significant nibble is transmitted last.

After these nibbles are re-assembled, this is the format of the data:

Byte 00 MIDI in filters

Byte 01 MIDI out filter

Byte 02 Local Control Filters

Byte 03 Voice Enable Filters

Byte 04 Wheel mode/MIDI in Velocity Shift

Byte 05 Breath Mode/Foot mode

Byte 06 Knob mode

Byte 07 Split Interval

Bulk Dump Requests

A bulk dump request is simply a command that may be sent to the DX7 from another piece of equipment (Computer, sequencer, Disk Drive, Etc.) that will cause the DX7 to transmit some of its internal data over MIDI. With E!, several formats of data are available. For those formats that support the bank and module select parameters, You should specify the bank of data that you require when issuing a GMR SYS/EX header.

Here is a list of the formats that are available for bulk dump requests:

Dump Request Format Numbers

To Get This Data..	Order a dump with this format #..
Single Voice/function	Format 10
32 Voices/functions	Format 11
1 Scale	Format 12
16 Scales	Format 13
DX status Block	Format 14

For example, to get a bulk dump of 32 GMR voices w/ function and performance data from a DX7 that is on channel 1 and responds to module number 00, you would send the DX7 the following string:

```
     F0 12 00 00 00 00 11 F7
                        ¦
Format number-----------+
```

E! Specific Parameter Changes

Because an E!quipped DX7 responds to many types of data that would be meaningless to a stock DX7, many types of parameter changes may be made through the GMR format. These parameters fall into 4 main categories:

1. Parameters on the Function Page, but not part of the YAMAHA's DX7 function data specification (i.e. Velocity Processing) [Format 40h]
2. Physical, and MIDI related Parameters [Format 41].
3. Scale Parameters [Format 42]
4. Load Command for Phys presets [Format 43]

Here is a list of all formats, along with the available parameters number, and associated data bytes for each format:

Please note that most of these formats contain more than one data byte per parm. When transferring these parms you MUST TRANSMIT ALL REQUIRED DATA BITS FOR EACH FORMAT!

1. Function Page Parms (Format 40)

   Parm number 00 00-Volume parms
   data bytes
   DX Volume (0-7)
   MIDI Volume (0-7)

   Parm number 00 01- Patches Parm
   data bytes
   Main Patch Number (0-127)
   AUX Patch number (0-127)

   Parm number 00 02- Velocity Parms
   data bytes
   DX Velocity Curve (0-7)
   MIDI Velocity Curve (0-7)

   DX Velocity Limit LO (0-127)
   DX Velocity Limit HI (0-127)

   MIDI Velocity Limit LO (0-127)
   MIDI Velocity Limit HI (0-127)

   DX Velocity Shift (0-31)
   MIDI Velocity Shift (0-31)

Parm number 00 03
data bytes
Key mode (0-4)
MIDI Out Channel (0-15)

Parm number 00 04- Timbre, transpose
data bytes
MIDI Transpose (0-63)
Timbre (0-63)

Parm number 00 05- Key limit parms
data bytes
DX Key limit LO (0-127)
DX Key Limit HI (0-127)
MIDI Key limit LO (0-127)
MIDI Key Limit HI (0-127)

2. Physical/ MIDI Parms (format 41)

Parm number 00 00- phys parm block
data bytes
MIDI in filter LO nibble
MIDI in filter HI nibble

MIDI out filter LO nibble
MIDI out filter Hi nibble

Local control filter LO nibble
Local control filter HI nibble

MIDI in Velocity shift

MIDI in knob mode

MIDI in wheel mode

MIDI in breath mode

Parm 00 02- MIDI parameters
data bytes

MIDI in parameters LO nibble
MIDI in parameters HI nibble

MIDI out parameters LO nibble
MIDI out parameters HI nibble

Parm number 00 03- Patch map entry
data bytes

Patch map number
Bank code
Patch number

3. Scale Parameters (format 42)

NO PARAMETER NUMBERS!

data bytes

Note number

Pitch nibble 1
Pitch nibble 2
Pitch nibble 3
Pitch nibble 4

4. Call Physical preset (FORMAT 43)

NO PARAMETER NUMBERS!

data byte
preset number (0-15)

Proper Installation of E!

WARNING!!!

Although installation of the E! system is a straight-forward process, GRey MAttEr REspOnsE, inc. strongly recommend that you refer installation to a qualified service tech. Certain knowledge is taken for granted regarding installation instructions (for example, how pins are counted on a chip)- if, therefore, the instructions appear vague and unclear, you should not attempt the installation of E! yourself. GRey MAttEr REspOnsE, inc. assume no responsibility for any damage that installation of the E! system may cause!

In order to install the E! system, you will need the following tools:

a philips-head screwdriver

a flat-bed screwdriver

a low-power soldering device

some solder

(You may also find it useful to refer to YAMAHA's DX7 service manual)

Before starting the actual installation, please check the DX7's serial number. If it is 2660 or lower, and it has never had its ROM updated, you must bring the DX7's "DM" board up to date BEFORE installing E!. Information on the required modifications is available from YAMAHA (Service news C84-3).

Please note that if you have experience with the installation of older E! boards (serial # less than 5000), you should read the installation instructions carefully for this new system. The two wires solder to different pins, and as a result, the keyboard no longer needs to be removed in order to install the board.

PLEASE NOTE THAT ALL VOICES CURRENTLY IN THE DX7 WILL BE DESTROYED DURING THE INSTALLATION OF E!. IT IS THEREFORE RECOMMENDED THAT YOU BACKUP YOUR VOICES BEFORE BEGINNING THE INSTALLATION.

[ ] First you must open the DX7. Use your philips-head screwdriver to remove the five screws that hold the DX7's "hood" or control panel in place (don't forget the screw behind the power switch).

[ ] You will notice two wires coming from the E! board. These will now be soldered onto the "DM" board of the DX7. In order to do this without removing the "DM" board, you must install these wires very carefully!

Here is the recommended procedure for the soldering of each of these wires:

1. Locate the correct pin of the correct chip.

2. Place the stripped end of the wire next to the proper pin such that the wire is standing straight up.

3. Make sure that the stripped portion of the wire does not extend above the top of the pin. If needed, you may shorten the stripped portion of the wire.

4. Very carefully solder the wire in place, and inspect all work.

Now, keeping this procedure in mind, solder the following connections

[ ] Solder the Black wire to chip 63, Pin 07
[ ] Solder the RED wire to chip 63, pin 10

[ ] There are two screws that must be removed now to make room for the standoffs that are located in the parts packet. Both screws are located on the "DM" board. The first screw is between IC59 and IC23. The second screw to be removed is right next to the DX7's battery. Place standoffs into each of the holes. and the remove the screws that are on the top of the standoffs.

[ ] Carefully remove two chips: IC14 (ROM CHIP), and IC21 (RAM CHIP). If you serial number is lower than 2660, you should also remove IC15 (SECOND ROM CHIP).

[ ] Turn the E! board so that the two ribbon cables face the back of the DX7, and all of the chips face up. Carefully plug the two Ribbon cables into the sockets left by IC14, and IC21. **INSPECT THIS STEP VERY**

CAREFULLY FOR THE POSSIBILITY THAT THE CABLES WERE NOT PUSHED ALL THE WAY INTO THE SOCKETS, AND FOR THE POSSIBILITY THE SOME PINS OF THE RIBBON CABLES MAY HAVE BEEN BENT DURING THIS STEP.

[ ] Place the E! board so that the two slots are over the two standoffs that you installed earlier. The new E! board has been designed to fit very snugly into the chassis of the DX7. This provides a very secure installation, however, you may need to make very minor adjustments in the routing of the cables that exist inside the DX7. Now use the two screws that you removed from the standoffs to screw the E! board into place.

[ ] Before continuing, you should test the DX7 for normal operation. The first time you turn the DX7 on, you should see the following message: "Problem.. Ram Corrupt!". This is not unusual! Simply allow the DX7 to run for approx. 10 seconds in this mode, and then turn the DX7's power switch off, and then on. Now, the LCD screen should say "Welcome to E! YAMAHA DX7". If not, please go back and check your work for errors.

[ ] Now the installation of E! is complete. Simply close the DX7's case, and replace the screws that you removed.

[ ] Don't forget to affix the E! sticker to the DX7 (suggested placement is directly to the left of the Algorithm chart).

E! Setup Procedure...

Thank you for performing this simple initialization for your customers. We're sure that they'll appreciate it.

Simply press the keystrokes that are indicated in parentheses...

1. Remove internal memory Protect (Function button, then OP SELECT button 2 times, button 31 2 times, off).

2. Set Ram format to "Voice". (button 20, on, off)

3. Go to Internal Mode (internal play)

4. Choose a Ram bank with the data entry slider or the YES/NO Buttons (start with internal 0)

5. Press any voice change button to choose a voice in that bank (Button 1)

6. Erase that bank (Function button, Then OP SELECT 2 times, then button 19, then Yes 2 times)

7. Go TO Internal Mode (Internal play)

8. Repeat steps 4 through 8 for banks Internal 1 through internal 9.

SOCIAL FEAR OF CREATIVITY

There is an epidemic fear of spontaneity; it is the "infantile" par excellence, for it does not take into account the so-called "reality"; it is irresponsible. But let us consider the social behavior in a usual political issue, and see what these terms mean. There is an issue, a problem; and there are opposing parties: the terms in which the problem is stated are taken from the policies, vested interests, and history of these parties, and these are considered to be the only possible approaches to the problem. The parties are not constituted from the reality of the problem (except in great revolutionary moments), but the problem is thought to be "real" only if stated in the accepted framework. But in fact neither of the opposing policies spontaneously recommends itself as a real solution of the real problem; and one is therefore continually confronted with a choice of the "lesser of two evils." Naturally such a choice does not excite enthusiasm or initiative. This is what is called being "realistic."

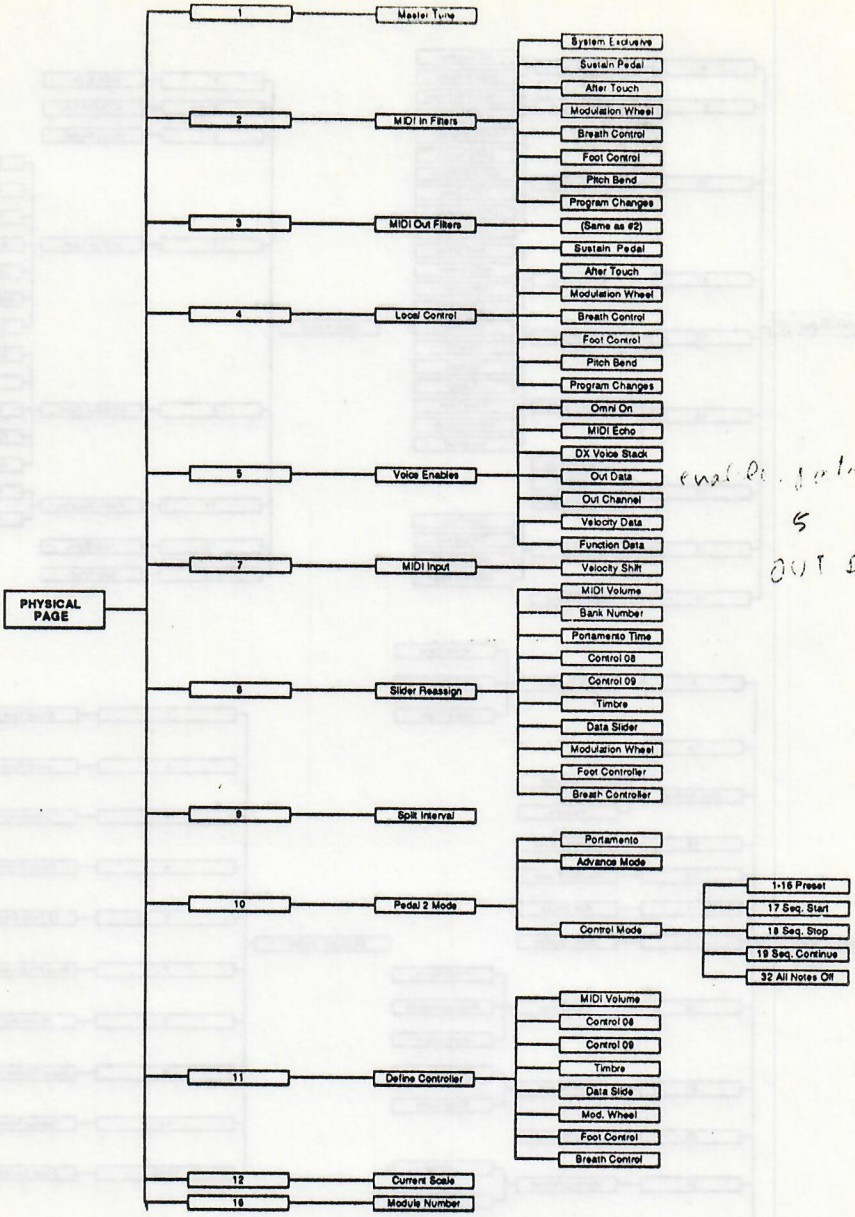
The creative approach to a difficulty is just the opposite: it tries to advance the problem to a different level by discovering or inventing some new third approach that is essential to the issue and that spontaneously recommends itself. (This then would be the policy and the party.) Whenever the choice is merely and exclusively the "lesser evil," without envisaging the truly satisfactory, it is likely that there is not a real problem but the mask of a real conflict that no-one wants to envisage. Our social problems are usually posed to conceal the real conflicts and prevent the real solutions - for these might require grave risks and changes. If a person, however, expresses a real irk, or simple common sense, and aims at a creative adjustment of the issue, this person is called escapist, impractical, utopian, unrealistic. It is the accepted way of posing the problem, and not the problem, that is taken for the "reality." We may observe this behavior in families, in politics, in the universities, in the professions. (So afterwards, we notice how past eras, whose social forms we have outgrown, seem to have been so stupid in some respects. We now see that there was no reason why a spontaneous approach, or a little common sense, could not easily have solved their problems, prevented a disastrous war, etc., etc. Except that, as history shows, whatever fresh approach was at that time suggested, was simply not "real.")

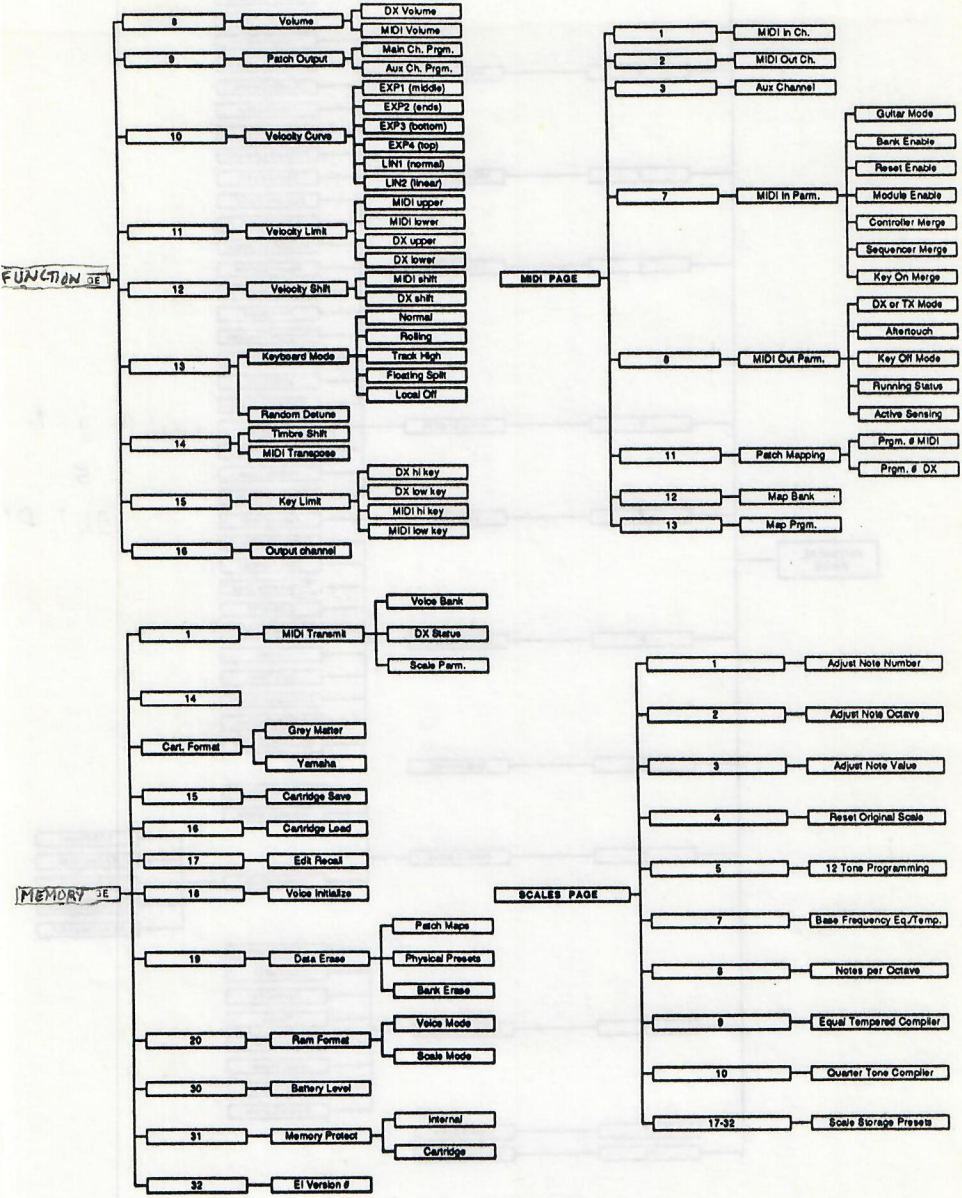
Most of the reality of the Reality-principle consist of these social illusions, and is maintained by self-conquest. This is obvious if we consider that in the natural science and in technology, where they are at their best, every kind of guess, wish, hope, and project is entertained without the

least guilt or anxiety; the real subject matter is not "conformed to" but is observed with fascination and experimented on with temerity. But in other affairs (where face must be saved) we have the following circle: the Reality-principle makes creative spontaneity otiose, dangerous, or psychotic; the repressed excitement is turned more aggressively against the creative self; and the "reality" of the norm then is experienced as real indeed.

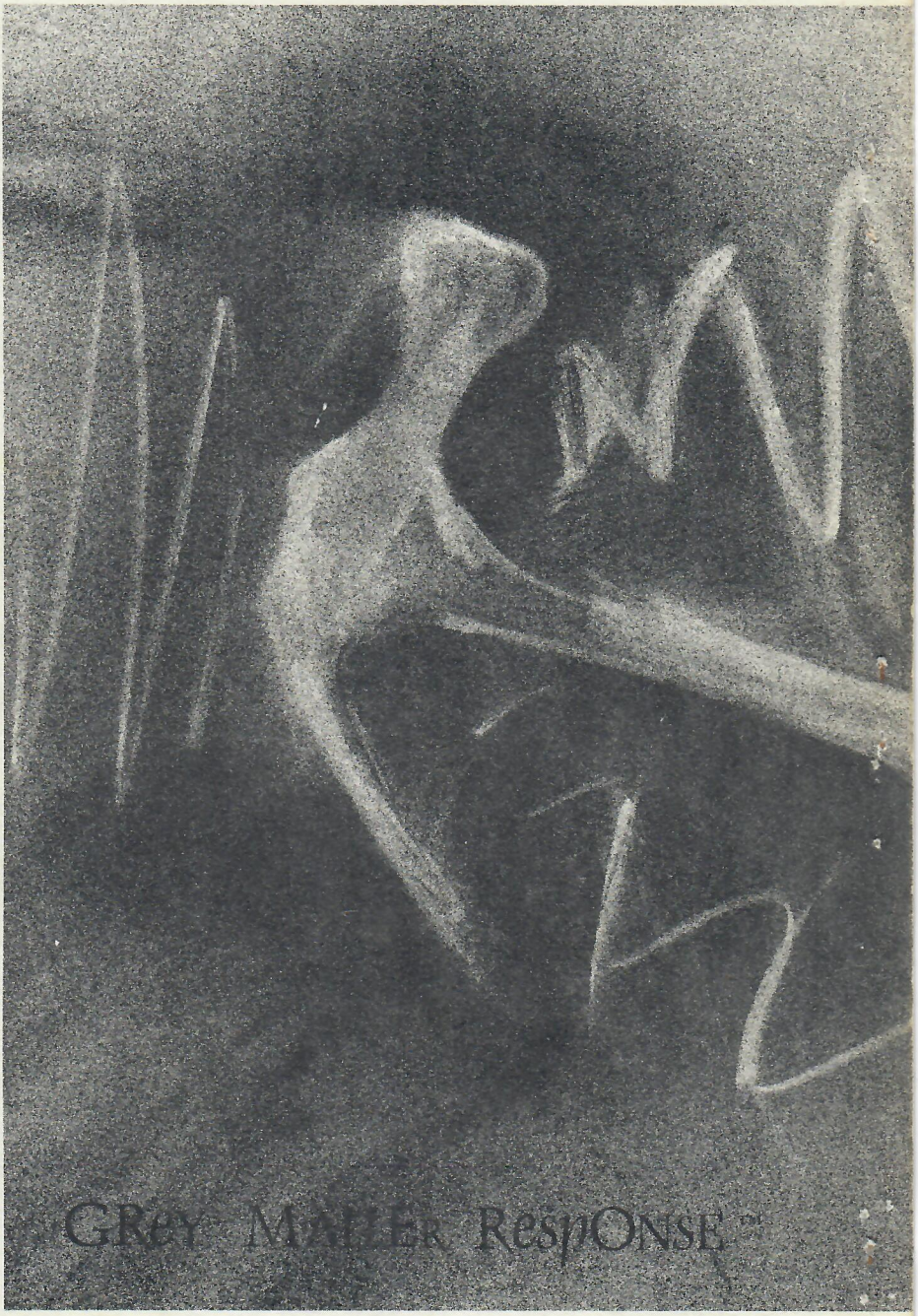
The most dismal timidity is not the fear of instinct nor of doing injury, but the fear of doing something in a new way of one's own; or to omit doing it if one is not really interested. But people consult manuals, authorities, newspaper columnists, informed opinion. What picture of the self will one then draw? It is not even assimilative, no less creative; it is introjective, additive, and regurgitating.

Taken from GESTALT THERAPY, written by Frederick Perls, M.D., Ph.D., Ralph F. Hefferline, Ph.D., and Paul Goodman, Ph.D. Pubished by Dell Publishing Co., Inc., U.S.A., 1951.


PHYSICAL PAGE
1
Master Tune
2
MIDI In Filters
System Exclusive
Sustain Pedal
After Touch
Modulation Wheel
Breath Control
Foot Control
Pitch Bend
Program Changes
3
MIDI Out Filters
(Same as #2)
4
Local Control
Sustain Pedal
After Touch
Modulation Wheel
Breath Control
Foot Control
Pitch Bend
Program Changes
5
Voice Enables
Omni On
MIDI Echo
DX Voice Stack
Out Data
Out Channel
Velocity Data
Function Data
7
MIDI Input
Velocity Shift
8
Slider Reassign
MIDI Volume
Bank Number
Portamento Time
Control 08
Control 09
Timbre
Data Slider
Modulation Wheel
Foot Controller
Breath Controller
9
Split Interval
10
Pedal 2 Mode
Portamento
Advance Mode
Control Mode
1-16 Preset
17 Seq. Start
18 Seq. Stop
19 Seq. Continue
32 All Notes Off
11
Define Controller
MIDI Volume
Control 08
Control 09
Timbre
Data Slide
Mod. Wheel
Foot Control
Breath Control
12
Current Scale
16
Module Number



E ! Version 2.0 Function Map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